

# **Clinical Practice Guidelines for Peritoneal Access**

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**Dr Martin Wilkie, Dr Sarah Jenkins & Mr Badri Shrestha**

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Please send feedback for the next edition to  
[martin.wilkie@sth.nhs.uk](mailto:martin.wilkie@sth.nhs.uk)

# **Clinical Practice Guidelines for Peritoneal Access**

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#### **ACKNOWLEDGEMENTS**

## Summary of clinical practice guidelines

	<b>Clinical Practice Guideline for peritoneal access (Modified GRADE of recommendation and evidence)</b>
<b>GUIDELINE 1.</b>	<b>PD Access: Access Team.</b>
Guideline 1.1	We recommend that each centre should have a dedicated team involved in the implantation and care of peritoneal catheters <b>(1C)</b> .
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<b>GUIDELINE 7.</b>	<b>PD Access: Audit</b>
Guideline 7.1	We recommend that there should be regular audit at not less than 12 monthly intervals of the outcome of catheter insertion as part of multi-disciplinary meetings of the PD team and the access operators <b>(1B)</b> .

## **SUMMARY OF AUDIT MEASURES**

1. Catheter patency - more than 80% of catheters should be patent at 1 year (censoring for death and elective modality change)
2. Complications following PD catheter insertion -
  - Bowel perforation < 1%
  - Significant haemorrhage <1%
  - Exit site infection within 2 weeks of catheter insertion <5%
  - Peritonitis within 2 weeks of catheter insertion <5%
  - Functional catheter problem requiring manipulation or replacement or leading to technique failure <20%

## INTRODUCTION

The current version provides a summary of recommendations for best practice in creating peritoneal access for patients on peritoneal dialysis. A more detailed review of peritoneal access is available in the Report from the Renal Association Working Party on Peritoneal Access (final version April 2008) ([www.renal.org](http://www.renal.org)).

The evidence for these recommendations has been assessed using the modified GRADE system. The modified GRADE system defines both the strength of the recommendations of the guideline authors and the level of evidence upon which each of the recommendations is based. This grading system classifies expert recommendations as “strong” (Grade 1) or “weak” (Grade 2) based upon the balance between the benefits and risks, burden and cost. The quality or level of evidence is designated as high (Grade A), moderate (Grade B), low (Grade C) or very low (D) depending on factors such as study design, directness of evidence and consistency of results. Grades of recommendation and quality of evidence may range from 1A to 2D. The GRADE system has been developed by an international group of guideline developers and methodologists to maximise the usefulness of clinical practice guidelines in the management of typical patients<sup>1-7</sup>. Most guideline organisations have recognised the need for a standard grading scheme and the GRADE system has been adopted by many leading organisations including NICE, SIGN, KDIGO, ERBP and KDOQI as well as UpToDate<sup>8,9</sup>.

### References:

1. Atkins D, Best D, Briss PA et al; GRADE Working Group. Grading quality of evidence and strength of recommendations. *BMJ* 2004; 328:1490.
2. Guyatt, G, Gutterman, D, Baumann, MH et al. Grading strength of recommendations and quality of evidence in clinical guidelines: report from an American college of chest physicians task force. *Chest* 2006; 129:174-181.
3. Guyatt GH, Vist GE, Falck-Ytter Y et al. An emerging consensus on grading recommendations? ACP Journal Club, 2006, 144:1.
4. Guyatt GH, Oxman AD, Vist GE et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* 2008; 336:924-926.
5. Guyatt GH, Oxman AD, Kunz R et al. GRADE: Incorporating considerations of resources use into grading recommendations. *BMJ* 2008; 336:1170-1173.
6. Guyatt GH, Oxman AD, Kunz R et al. GRADE: going from evidence to recommendations. *BMJ* 2008; 336: 1049-1051.
7. Jaeschke R, Guyatt GH, Dellinger P et al. Use of GRADE grid to reach decisions on clinical practice guidelines when consensus is elusive. *BMJ* 2008; 337:327-330.
8. Uhlig K, MacLeod A, Craig J et al. Grading evidence and recommendations for clinical practice guidelines in nephrology. A position statement from Kidney Disease: Improving Global Outcomes (KDIGO). *Kidney Int* 2006; 70:2058-2065.
9. Kidney Disease: Improving Global Outcomes. KDIGO clinical practice guidelines for the prevention, diagnosis, evaluation and treatment of Hepatitis C in chronic kidney disease. *Kidney Int* 2008; 73 (S109): S1-S99.

Grade of Recommendation	Clarity of risk/benefit	Quality of supporting evidence	Implications for clinical practice
<b>1A</b> Strong recommendation. High quality evidence.	Benefits clearly outweigh risk and burdens, or vice versa	Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Strong recommendations, can apply to most patients in most circumstances without reservation. Clinicians should follow a strong recommendation unless there is a clear rationale for an alternative approach.
<b>1B</b> Strong recommendation. Moderate quality evidence.	Benefits clearly outweigh risk and burdens, or vice versa	Evidence from randomized, controlled trials with important limitations (inconsistent results, methods flaws, indirect or imprecise), or very strong evidence of some other research design. Further research may impact on our confidence in the estimate of benefit and risk.	Strong recommendation and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
<b>1C</b> Strong recommendation. Low quality evidence.	Benefits appear to outweigh risk and burdens, or vice versa	Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Strong recommendation, and applies to most patients. Some of the evidence base supporting the recommendation is, however, of low quality.
<b>1D</b> Strong recommendation Very low quality evidence	Benefits appear to outweigh risk and burdens, or vice versa	Evidence limited to case studies	Strong recommendation based mainly on case studies and expert judgement
<b>2A</b> Weak recommendation. High quality evidence.	Benefits closely balanced with risks and burdens	Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Weak recommendation, best action may differ depending on circumstances or patients' or societal values
<b>2B</b> Weak recommendation. Moderate quality evidence.	Benefits closely balanced with risks and burdens, some uncertainty in the estimates of benefits, risks and burdens	Evidence from randomized, controlled trials with important limitations (inconsistent results, methods flaws, indirect or imprecise), or strong evidence of some other research design. Further research may change the estimate of benefit and risk.	Weak recommendation, alternative approaches likely to be better for some patients under some circumstances
<b>2C</b> Weak recommendation. Low quality evidence.	Uncertainty in the estimates of benefits, risks, and burdens; benefits may be closely balanced with risks and burdens	Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Weak recommendation; other alternatives may be reasonable
<b>2D</b> Weak recommendation Very low quality evidence	Uncertainty in the estimates of benefits, risks, and burdens; benefits may be closely balanced with risks and burdens	Evidence limited to case studies and expert judgement	Very weak recommendation; other alternatives may be equally reasonable

# FULL CLINICAL PRACTICE GUIDELINES

## 1. Peritoneal Dialysis Access (PD Access) (Guideline 1.1)

### Guideline 1.1 - PD Access : The access team

We recommend that each centre should have a dedicated team involved in the implantation and care of peritoneal catheters **(1C)**.

#### Rationale

The access team should comprise nurses, nephrologists and surgeons who have experience in peritoneal dialysis. Each member of the team should understand the importance to the patient of successful access placement and the need for attention to detail in the reduction of complications<sup>1</sup>.

1. Flanigan M, Gokal R. Peritoneal catheters and exit-site practices toward optimum peritoneal access: a review of current developments. *Perit Dial Int.* 2005 Mar-Apr; 25(2):132-9.

## 2. Peritoneal Dialysis Access (PD Access) (Guideline 2.1)

### Guideline 2.1 - PD Access : Timing and co-ordination of referral and surgery

We suggest that catheter insertion should be performed, whenever possible, at least 2 weeks before starting peritoneal dialysis. Small dialysate volumes in the supine position can be used if dialysis is required earlier **(2B)**.

#### Rationale

There are two main patient groups requiring PD access.

(1) Patients with progressive renal failure predicted to need dialysis; for these patients access should be co-ordinated from the CKD low clearance clinic. The objective is that access is placed sufficiently early to enable the patient to train for PD in a timely fashion while residual renal function is sufficient to avoid the need for temporary vascular access for HD if there are problems with catheter function. It is not recommended that patients commencing PD have an arterio-venous fistula formed, unless there is a plan to transfer to HD within a few months.

(2) Patients with stage 5 CKD presenting as uraemic emergencies (late referrals – 23% new patients in the UK<sup>1</sup>); for these patients there should be a pathway that allows the choice of PD as a modality. This requires adequate patient education to be available to permit choice. The advantage of placing PD access in patients who have not had the opportunity to be prepared for RRT is that the requirement for prolonged use of central venous access can be reduced. This has to be balanced against the potential for complications associated with the early use of PD catheters<sup>2</sup>.

It seems appropriate to adopt the European Best Practice standard for the timing of PD catheter insertion – “Whenever possible, the catheter insertion should be performed at least 2 weeks before starting peritoneal dialysis. Small dialysate volumes in the supine position can be used if dialysis is required during this period”<sup>3</sup>.

1. Registry UR. New adult patients starting renal replacement therapy in the UK in 2004. UK Renal Registry Report 2005. Chapter 3.
2. Povlsen JV, Ivarsen P. How to start the late referred ESRD patient urgently on chronic APD. *Nephrol Dial Transplant*. 2006 Jul; 21 Suppl 2:ii56-9.
3. Dombros N, Dratwa M, Feriani M, Gokal R, Heimbürger O, Krediet R, et al. European best practice guidelines for peritoneal dialysis. 3 Peritoneal access. *Nephrol Dial Transplant*. 2005 Dec; 20 Suppl 9:ix8-ix12.

### **3. Peritoneal Dialysis Access (PD Access) (Guideline 3.1)**

#### **Guideline 3.1 - PD Access : Implantation protocol**

We recommend that renal units should have clear protocols for peri-operative catheter care including the use of antibiotic prophylaxis (**1A**).

#### **Rationale**

The following points should be included in the peri-operative catheter care protocol-

- Pre-operatively – checking for hernias, screening for MRSA and nasal carriage of *Staphylococcus Aureus*, identifying a catheter of a suitable length and marking the exit site with the patient sitting or standing.
- Pre-implantation – bowel preparation with laxatives, ensuring bladder emptying, administration of prophylactic antibiotics, surgical site preparation according to NICE guidance<sup>1</sup>.
- Post-procedure – catheter flushed and capped off using suitable dialysate, exit site covered with a suitable dressing and if possible not disturbed for 5 – 10 days, immobilisation of the catheter, discharge home with supply of aperients, with the patient being given advice on recognition of potential complications.

Administration of prophylactic antibiotics is recommended to reduce the risk of catheter site infection, peritonitis and wound sepsis, and there is RCT evidence for the use of vancomycin<sup>2</sup>. The Cochrane collaboration found 4 trials of iv antibiotics and found the evidence to be strong in preventing catheter insertion associated early peritonitis, but not tunnel or exit site infection<sup>3</sup>. This evidence is also reviewed in the ISPD peritonitis guidelines<sup>4</sup>. The choice of antibiotic should be based upon local guidelines with consideration given to efficacy, risks of selection of resistant organisms and development of *Clostridium difficile* colitis.

1. Leaper D, Burman-Roy S, Palanca A, Cullen K, Worster D, Gautam-Aitken E, et al. Prevention and treatment of surgical site infection: summary of NICE guidance. *BMJ*. 2008; 337:a1924.
2. Gadallah MF, Ramdeen G, Mignone J, Patel D, Mitchell L, Tatro S. Role of preoperative antibiotic prophylaxis in preventing postoperative peritonitis in newly placed peritoneal dialysis catheters. *Am J Kidney Dis*. 2000 Nov; 36(5):1014-9.

3. Strippoli GF, Tong A, Johnson D, Schena FP, Craig JC. Antimicrobial agents to prevent peritonitis in peritoneal dialysis: a systematic review of randomized controlled trials. *Am J Kidney Dis.* 2004 Oct; 44(4):591-603.
4. Piraino B, Bailie GR, Bernardini J, Boeschoten E, Gupta A, Holmes C, et al. Peritoneal dialysis-related infections recommendations: 2005 update. *Perit Dial Int.* 2005 Mar-Apr; 25(2):107-31.

## **4. Peritoneal Dialysis Access (PD Access) (Guidelines 4.1-4.4)**

### **Guideline 4.1 - PD Access: The implantation technique**

We recommend that local expertise at individual centres should govern the choice of method of Peritoneal Dialysis (PD) catheter insertion **(1B)**.

### **Guideline 4.2 - PD Access: The implantation technique**

We recommend that each PD unit should have the ability to manipulate or re-implant PD catheters when necessary **(1B)**.

### **Guideline 4.3 - PD Access: The implantation technique**

We recommend that urgent removal of PD catheters should be available where necessary **(1A)**.

### **Guideline 4.3 - PD Access: The implantation technique**

We recommend that timely surgical support should be available for the review of PD patients **(1A)**.

### **Rationale**

There is no RCT evidence to support one method of insertion over another – however, the method needs be determined by patient characteristics. For more complicated patients, including those with previous significant abdominal surgery, a technique that involves direct vision is necessary such as laparoscopic or open insertion<sup>1</sup>.

Peritoneal access surgery is generally considered as part of the overall requirement for dialysis access and should include facilities for both catheter insertion and removal. Data from the Renal Registry indicates that the incident renal replacement population was 113 per million of the population in 2006, with 20% starting on PD<sup>2</sup>. About 2/3rds of catheters inserted in the UK are performed using the open surgical technique, with the majority of the others being done using the medical percutaneous technique.

1. Crabtree JH. Fluoroscopic placement of peritoneal dialysis catheters: a harvest of the low hanging fruits. *Perit Dial Int.* 2008 Mar-Apr; 28(2):134-7.
2. Registry UR. New adult patients starting renal replacement therapy in the UK in 2004. UK Renal Registry Report 2005. Chapter 3.

## **5. Peritoneal Dialysis Access (PD Access) (Guidelines 5.1-5.4)**

### **Guideline 5.1 - PD Access : The Facilities for PD Catheter Insertion**

We recommend that a dedicated area should be used for catheter insertion with appropriate staffing, suction, oxygen and patient monitoring facilities **(1A)**.

#### **Rationale**

The anaesthetic requirement depends on the technique selected, which is influenced by the characteristics of the patient. Typically for percutaneous or peritoneoscopic routes sedation may be required<sup>1</sup>. This is commonly achieved with a combination of an opiate and a benzodiazepine (e.g. pethidine and midazolam), with 1-2% lignocaine given subcutaneously (usually without adrenaline) to the insertion site, exit site and tunnel. Conscious sedation needs to be managed according to local clinical governance procedures.

1. Zappacosta AR, Perras ST, Closkey GM. Seldinger technique for Tenckhoff catheter placement. *ASAIO Trans.* 1991 Jan-Mar; 37(1):13-5.

### **Guideline 5.2 - PD Access : The Facilities for PD Catheter Insertion**

We suggest that no particular catheter type is proven to be better than another **(2C)**.

#### **Rationale**

The Cochrane review did not find any advantage for straight versus coiled catheters, single or double cuff, median or lateral incision<sup>1</sup>. However, a RCT reported improved PD technique survival for straight versus coiled catheters<sup>2</sup> and a further RCT reported that coiled catheters may have higher migration rates than straight catheters<sup>3</sup>. These data relate to relatively small studies and we would not advocate at this stage that centres with good outcomes change their choice of catheters type until more information is available. Although subcutaneous burying of the catheter until use (Moncrief method) was not associated with a reduction in infectious complications, its use may have advantages for the relationship between the timing of catheter insertion and the start of training.

1. Strippoli GF, Tong A, Johnson D, Schena FP, Craig JC. Catheter type, placement and insertion techniques for preventing peritonitis in peritoneal dialysis patients. *Cochrane Database Syst Rev.* 2004(4):CD004680.

2. Johnson DW, Wong J, Wiggins KJ, Kirwan R, Griffin A, Preston J, et al. A randomized controlled trial of coiled versus straight swan-neck Tenckhoff catheters in peritoneal dialysis patients. *Am J Kidney Dis.* 2006 Nov; 48(5):812-21.

3. Lo WK, Lui SL, Li FK, Choy BY, Lam MF, Tse KC, et al. A prospective randomized study on three different peritoneal dialysis catheters. *Perit Dial Int.* 2003; 23 Suppl 2:S127-31.

### **Guideline 5.3 - PD Access : The Facilities for PD Catheter Insertion**

We suggest that a catheter of a suitable size should be used **(2C)**.

## **Rationale**

It is good practice to make an assessment of the required length of peritoneal catheter since a catheter of inappropriate length can lead to pain or impaired function<sup>1,2</sup>.

1. Crabtree JH, Burchette RJ, Siddiqi NA. Optimal peritoneal dialysis catheter type and exit site location: an anthropometric analysis. *ASAIO J.* 2005 Nov-Dec; 51(6):743-7.
2. Crabtree JH. Selected best demonstrated practices in peritoneal dialysis access. *Kidney Int Suppl.* 2006 Nov (103):S27-37.

## **Guideline 5.4 - PD Access : The Facilities for PD Catheter Insertion**

We suggest that units should explore the possibility for increasing the number of day case catheter insertions **(2C)**.

## **Rationale**

The use of day case facilities has considerable advantages for patients and resource utilisation<sup>1</sup>.

1. Kelly J, McNamara K, May S. Peritoneoscopic peritoneal dialysis catheter insertion. *Nephrology (Carlton).* 2003 Dec; 8(6):315-7.

## **6. Peritoneal Dialysis Access (PD Access) (Guideline 6.1- 6.2)**

### **Guideline 6.1 - PD Access: Training for PD catheter insertion**

We recommend that PD catheter insertion training should be available to all trainees with an interest **(1C)**.

## **Rationale**

The Renal Association Training Committee should advise the inclusion of PD catheter insertion as an optional component of the curriculum for trainees, although this will not be taken up by all trainees<sup>1</sup>. A procedure-based competency for PD catheter insertion should be included in the JRCPTB Renal Medicine Specialty Training Curriculum.

1. Berns JS, O'Neill WC. Performance of procedures by nephrologists and nephrology fellows at U.S. nephrology training programs. *Clin J Am Soc Nephrol.* 2008 Jul; 3(4):941-7.

### **Guideline 6.2 - PD Access: Training for PD catheter insertion**

We recommend that PD catheter insertion should not be delegated to inexperienced unsupervised operators **(1A)**.

## **Rationale**

Successful peritoneal access is crucial and should be performed by an operator (surgeon, specialist nurse or physician) with training and expertise in creating peritoneal access<sup>1</sup>.

1. Flanigan M, Gokal R. Peritoneal catheters and exit-site practices toward optimum peritoneal access: a review of current developments. *Perit Dial Int.* 2005 Mar-Apr; 25(2):132-9.

## **7. Peritoneal Dialysis Access (PD Access) (Guideline 7.1)**

### **Guideline 7.1 - PD Access : Audit of PD catheter insertion**

We recommend that there should be regular audit at not less than 12 monthly intervals of the outcome of catheter insertion as part of multidisciplinary meetings of the PD team and the access operators **(1B)**.

#### **Rationale**

There is RCT evidence to demonstrate that audit can improve practice<sup>1</sup>. The primary marker of successful outcome is primary catheter patency. Although we do not have a specific audit standard in this area it has been recommended that >80% of catheters should be patent at 1 year (censoring for death and elective modality change)<sup>2</sup>. The following are audit standards for catheter related complications –

- Bowel perforation < 1%
- Significant haemorrhage <1%
- Exit site infection within 2 weeks of catheter insertion <5%
- Peritonitis within 2 weeks of catheter insertion <5%
- Functional catheter problem requiring manipulation or replacement or leading to technique failure <20%

At least every 12 months a combined meeting between surgeons (or other health providers inserting PD catheters) and the nephrology team should be held to review PD catheter data.

Data to be collected and used in the audit should include –

- Peri-operative complications including bowel perforation, significant haemorrhage (requiring transfusion or surgical intervention)
- Early infections – peritonitis and exit site infections within 2 weeks of catheter insertions
- Dialysate fluid leaks
- Catheter dysfunction at the time of first use that requires catheter manipulation or replacement or results in technique failure.

We recommend that a subset of data should be shared nationally via the Renal Registry.

1. Jamtvedt G, Young JM, Kristoffersen DT, O'Brien MA, Oxman AD. Audit and feedback: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev.* 2006(2):CD000259.

2. Flanigan M, Gokal R. Peritoneal catheters and exit-site practices toward optimum peritoneal access: a review of current developments. *Perit Dial Int.* 2005 Mar-Apr; 25(2):132-9.

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## **Declaration of competing interests**

Martin Wilkie has received lecturing honoraria from Gambro, Baxter and Fresenius and has participated in clinical trials with Baxter and Fresenius.